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## ABSTRACT

Findings from an evaluation of Grand Rapids' staff development program, the Effective Instruction initiative, are presented in this paper. The program consisted of inservice teacher training and practice, coaching, and feedback. The level of classroom implementation of program concepts and skills was assessed through pre- and post-observations of classroom performance and structured interviews with a sample of participating teachers in two elementary schools. Student achievement was measured by comparing before and after standardized math and reading test scores and comparing scores with those of control classrooms. Observation findings indicate that both schools demonstrated a 10-15 percent increase in productive teacher behaviors. Interviews showed a significant increase in the level of instructional thought, suggesting the effectiveness of behavior modeling, practice, and coaching. Student outcomes showed gains in achievement scores as compared with those of the matched control schools. Seven tables are included. (10 references) (LMI)

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A STUDY OF TEACHER INSTRUCTIONAL DECISION-MAKING  
IN THE GRAND RAPIDS, MICHIGAN PUBLIC SCHOOLS

by

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## I. INTRODUCTION

The Effective Instruction initiative of the Grand Rapids Public Schools' Staff Development Program began in November of 1985. The program consisted of three courses totaling more than 100 hours conducted over a three year period. During the first two years, much of the training emphasized the learning theory and research popularized by Dr. Madeline Hunter. The third year of training emphasized peer coaching and communication skills.

In the spring of 1988, the Steelcase Foundation, working through the Grand Rapids Public Education Fund, provided a \$500,000 grant to enable the district to expand the number of teachers participating in the training. In addition, the grant stipulated that an evaluation be developed to measure the effects of the training.

Initially, 12 "high-need" schools were identified as potential sites for the evaluation study. The 12 schools chosen had stable, low achieving profiles over the last five years. All 12 schools were informed of the project and invited to participate. Finally, two elementary schools (Project Schools A and B) were chosen to participate in the evaluation study based upon their identified needs and the number of staff members who agreed to participate in the program.

The evaluation project was to be two years in length. Teachers would receive approximately 60 hours of training during that time. In addition, they would receive regular on-site coaching in their own classrooms. The evaluation would focus on two primary areas:

- the impact of staff development training on teacher behavior in the classroom
- the effect of teacher training on student achievement

## II. PROGRAM DESCRIPTION

The district Staff Development Program emphasizes a body of information that relates to effective instructional practices. Divided into three courses, the program content is typically taken over a three year period. Each course consists of 36 hours of training; 30 of which are scheduled as released time. Sessions within a course are generally offered one day a week over a six week period. One session within each course is scheduled for a Saturday.

During the 1988-89 school year, the two project schools received instruction in the content of the first course. Sessions were held between October and December 1988, using a combination of after school and released time formats. Sessions were held on-site at each project school. Teachers in the project schools who had been previously trained in the first course opted to take the second year of training with regularly scheduled district classes.

The first year content included such areas as: hemisphericity, motivation theory, Bloom's Taxonomy, lesson design, dignifying students' errors and reinforcement theory. Training activities included lectures, group discussions and opportunities for participant practice with feedback.

On-site coaching was seen as an essential component of the training (Fullan, 1982; Costa and Kenneth, 1986; Johnson and Johnson 1987; Joyce and Showers, 1988). Research in the field and current literature suggest that very little change in teacher behavior is generated by staff development programs using only a classroom instruction format. Program planners believed that if teacher training was to positively affect student achievement, peer coaching would need to be an integral part of that training.

In January, following the completion of the training in the first year content, coaching was implemented in the project schools. The purpose of the coaching component was to help teachers transfer the skills they had learned to their classroom teaching.

The goal of the Staff Development specialists, who conducted the on-site training, was to coach each classroom teacher twice monthly. In addition, coaching teams of three and four teachers were established. Each teacher was asked to participate in one or two coaching experiences a month within their coaching teams. Substitute teachers were provided to facilitate the team coaching. Potentially, teachers could have been involved in 12 coaching experiences, as coaching was scheduled January through April with weeks off for conferences, vacations, etc. In Project School A the number of coaching experiences ranged from six to eleven times per teacher. In Project School B the number ranged from five to ten times per teacher. On average, teachers in Project School A participated in more coaching experiences.

During the 1989-90 school year, participants continued to receive additional Effective Instruction training and coaching continued as an important part of the program.

### III. STUDY DESIGN

As a condition of financial support, the Steelcase Corporation requested an evaluation be conducted using student achievement as the measure of the Staff Development program's effectiveness. The Educational Research and Development Center of the Grand Rapids Public Schools developed a multi-faceted evaluation design. The evaluation design attempted to measure two outcomes: the level of classroom implementation and changes in student achievement.

Measures of classroom implementation included:

- pre and post observations of teachers classroom behavior
- a series of structured interviews which identify instructional thought

Measures of student achievement included:

- changes in normal curve equivalent (NCE) scores for CAT-85 reading and math at project and matched control schools

#### IV. STUDY FINDINGS

##### A. Observations of Teachers' Classroom Behavior

A classroom observation component was included in the project to document actual changes in classroom behavior. Pat Wolfe's Instructional Skills Observation Instrument (ISOI) was modified for use in the project. The instrument contains five subsections totalling 100 possible points. Subsections include: set, instruction, guided practice, independent practice and interaction/involvement. Possible points in each subsection vary to reflect a subsection's influence upon the learning process. Points are awarded for the appropriate inclusion or exclusion of a behavior, reflecting an emphasis on teacher decision making.

Seven observers were selected from various districts throughout the state. Selection was based upon fluency in the instructional model being taught. Observers received 18 hours of training in the use of the ISOI. An inter-rater reliability of .93 was established during the training period.

Announced observations were conducted during September of 1988, prior to training. Teachers were observed in both language arts and mathematics and the data collected was considered as a baseline score. Training sessions were completed between October 1988 and January 1989. Peer coaching occurred between January and June of 1989. A second series of observations was conducted in March 1989.

Tables 1 and 2 reflect the September 1988 and March 1989 score averages of project teachers for both language arts and math. For the purposes of this paper, ISOI scores will include only teachers who participated in the structured interviews.

TABLE 1  
PROJECT SCHOOL A  
ISOI TOTAL SCORES

##### Language Arts

| # of Teachers | September '88 | March '89 | Percent Change |
|---------------|---------------|-----------|----------------|
| 7             | 49.0          | 61.0      | +12%           |

##### Math

| # of Teachers | September '88 | March '89 | Percent Change |
|---------------|---------------|-----------|----------------|
| 7             | 46.0          | 59.0      | +13%           |

TABLE 2  
PROJECT SCHOOL B  
ISOI TOTAL SCORES

Language Arts

| # of Teachers | September '88 | March '89 | Percent Change |
|---------------|---------------|-----------|----------------|
| 8             | 61.0          | 67.0      | +6%            |

Math

| # of Teachers | September '88 | March '89 | Percent Change |
|---------------|---------------|-----------|----------------|
| 8             | 50.0          | 78.0      | +28%           |

Teachers at Project School A were more likely to show increases in their ISOI scores between baseline and post-test observations in the area of math. Five teachers demonstrated gains in their ISOI score in math while only four teachers demonstrated gains in the area of language arts. Teachers in Project School B were also more likely to show increases in their ISOI scores between baseline and post-test observations in the area of math. All eight teachers at Project School B demonstrated gains in math while only four teachers demonstrated gains in the area of language arts. This finding may be a function of the structured nature of mathematics instruction. Language arts is much less sequential and therefore may require a more sophisticated level of skill development.

**B. Structured Interviews to Identify  
Teachers' Levels of Instructional Thought**

The research tool used to assess teacher instructional decision making is the Taxonomy of Teacher Reflective Thought and its associated interview process. A number of contemporary writers have coalesced around the term, teacher reflection, to describe a teacher's instructional decision making (Feiman, 1979; Goodman, 1984; Parsons, 1983; Spring, 1985; Zeichner and Liston, 1987). One definition of reflection that is consistent with the approach taken by these contemporary researchers is "the teacher's ability to make rational (educational) choices and to assume responsibility for one's choices" (Ross, 1987), in other words to make instructional decisions.

As a result of the investigation of reflective thought, the authors have developed a formative theory that organizes such thinking into four hierarchical stages -- Descriptive, Classification, Explanation and Conditional.

At the **Descriptive** stage, the teacher can describe a recent example of teaching to the interviewer.

At the **Classification** stage, the teacher uses pedagogical language to organize the description and to relate it to other examples of teaching.

At the **Explanation** stage, the teacher uses pedagogical principles to explain why the teaching example was successful or unsuccessful.

At the **Conditional** stage, the teacher places the teaching example in the context of actual students, the classroom, school and/or society and indicates how these conditions foster or hinder learning success.

The four stages are further sub-divided into seven levels:

- Level 1 - Teacher is not able to describe a recent example of teaching.
- Level 2 - Teacher is able to describe a recent example of teaching but without using pedagogical concepts.  
(Example - "I taught this lesson on bats and the students really enjoyed it.")
- Level 3 - Teacher describes a recent example of teaching using pedagogical concepts to label the events.  
(Example - "I taught this lesson on bats and we brainstormed on the board all the things we knew about them. It's a guided reading technique called KWL -- the K stands for 'prior knowledge'.)
- Level 4 - Teacher describes a recent example of teaching using pedagogical concepts to label the events but when asked to explain why the lesson was successful or unsuccessful is unable to relate effects to an established, relevant pedagogical principle. (Example - "It works because all the students participate.")
- Level 5 - Teacher describes a recent example of teaching using pedagogical concepts to label the events and when asked to explain why the lesson was successful or unsuccessful is able to relate effects to one or more established, relevant pedagogical principles. (Example - "The 'prior knowledge' activity works because it gets everyone on a level field as far as background knowledge is concerned. It sets up a framework inside everyones' head that we can then use to understand the reading on bats.")

Level 6 - Teacher describes a recent example of teaching using pedagogical concepts to label the events and when asked to explain why the lesson was successful or unsuccessful is able to relate effects to one or more established, relevant pedagogical principles. In addition, the teacher relates the lesson to the students, classroom, community and/or larger society. (Example - "Kids, in this community especially, are at different levels of background. Some have very rich parents who take them to museums and zoos and travel with them. Other kids have very little exposure to the outside world. The guided reading activity gives everyone an opportunity to say something.")

Level 7 - In addition to the previous levels, the teacher relates the lesson to universal moral/ethical/socio-political principles. (Example - "It's critical if urban education is going to be successful to encourage children to learn from each other. Competition between students who have all the advantages and students who lack these advantages will predictably be unfair. The guided reading activity is a great way to even things out a little as far as background knowledge is concerned. Everyone begins to read about bats with approximately the same level of prior knowledge.")

A series of three interviews were conducted using the Taxonomy of Teacher Reflective Thought. Structured interviews were held with seven teachers from Project School A and eight teachers from Project School B. Pretest interviews were held in September 1988, prior to the beginning of training. Interim interviews were held in January 1989, after the completion of training and prior to the initiation of coaching. Post-test interviews were held in June 1989, following approximately six months of peer coaching. The schedule of the interviews provided information regarding the effect of inservice knowledge and skills alone, or with the addition of coaching, upon the desired teacher behaviors. The intent was to assess these changes over time, using the Taxonomy of Teacher Reflective Thought.

Teachers were interviewed by Marvin Pasch and their oral responses to taxonomy related questions were tape recorded, transcribed and analyzed by six members of the Taxonomy research team, each of whom had examined over one hundred previous interviews and had been judged as reliable assessors of teacher reflective thought using the Taxonomy instrument. As the Pretest and interim test interviews were coded concurrently, the assessors were not aware whether a particular interview was a pretest or interim test interview.

To assess if teachers were affected by the knowledge and skills presented in the Staff Development project, the six assessors were asked to determine if a particular interview was a pretest or interim test. The information they used for analysis was a list of inservice terms and concepts provided by the Staff Development specialists.

The interview questions provided the respondent the opportunity to select a teaching example and describe it using any language of his/her choice. There were no prompts or cues that the Staff Development project concepts and/or terminology were expected. Consequently, if the teacher chose to utilize concepts or terms learned in the Staff Development project, one could assume they had been internalized into that teacher's reflective thought.

When given the thirty pretest and interim test interview transcriptions in a random order, the six coders were able to identify the pretest and interim test interviews 76 percent of the time, a statistically significant (.01) result, given the expected chance result of 50 percent. Four of the six coders were successful at the 80 percent or above level.

As shown in Table 3, the analysis of pretest and interim test interviews revealed no statistically significant differences between the two sets of interviews. In fact, the mean of the pretest interviews, 4.78 and the mean of the interim test interviews, 4.71 were almost identical. Thus, the interviews did not surface any statistically significant changes in the level of pedagogical thinking between September, 1988 and January, 1989. This represents the period of presentation of the inservice knowledge and skills.

The comparison of pre, interim and post-test interviews can also be seen in Table 3. Table 3 shows statistically significant differences between the mean Taxonomy level on the pretest (4.78) and the interim test (4.71) when compared to the mean level on the post-test (5.13). A mean difference of that magnitude suggests that the impact of the Staff Development project was substantial. In terms of educational significance, the magnitude of the increase amounts to almost a half-step in the taxonomy hierarchy, moving the average response from Level 4 to Level 5, using pedagogical principles to explain teaching events.

The absence of apparent impact, as assessed in the pre and interim test interviews between September and January suggests that behavior modeling, practice and coaching are critical ingredients in an inservice program that focuses on the integration of knowledge and skills into teaching behavior. The results of modeling, practice and coaching, that took place between January and June, surfaced in the post-test interviews.

TABLE 3  
COMPARISON OF PRE, INTERIM AND POST-TEST RESULTS  
One Factor ANOVA - Repeated Measures for X1 - X3

| Source:          | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|------------------|-----|-----------------|--------------|---------|----------|
| Between subjects | 89  | 158.385         | 1.78         | 1.338   | .0513    |
| Within subjects  | 180 | 239.333         | 1.33         |         |          |
| treatments       | 2   | 9.274           | 4.637        | 3.588   | .0297    |
| residual         | 178 | 230.059         | 1.292        |         |          |
| Total            | 269 | 397.719         |              |         |          |

Reliability Estimates for- All treatments: .253 Single Treatment: .101

One Factor ANOVA - Repeated Measures for X1 - X3

| Group:       | Count: | Mean: | Std. Dev.: | Std. Error: |
|--------------|--------|-------|------------|-------------|
| POSTTEST     | 90     | 5.133 | 1.03       | .109        |
| PRETEST      | 90     | 4.778 | 1.444      | .152        |
| INTERIM TEST | 90     | 4.711 | 1.104      | .116        |

One Factor ANOVA - Repeated Measures for X1 - X3

| Comparison:         | Mean Diff: | Fisher PLSD: | Scheffe F-T: | Dunnett t: |
|---------------------|------------|--------------|--------------|------------|
| POSTTEST vs PRETEST | .356       | .334*        | 2.201        | 2.098      |
| POSTTEST vs INTERIM | .422       | .334*        | 3.103*       | 2.491      |
| PRETEST vs INTERIM  | .067       | .334         | .077         | .393       |

\*Significant at 95%

The findings shown in Table 4 and Table 5 indicate that the Taxonomy level scores of the teachers interviewed at Project School A were lower than the scores of their counterparts at Project School B on pre and interim tests. However they performed as well or better than Project School B teachers in the post-test interviews. In fact, as shown in the two tables, the gain from the interim-test to the post-test was statistically significant at Project School A but not at Project School B. Thus, it can be inferred that teachers at Project School A gained more from the practice and coaching activities than did the teachers at Project School B.

TABLE 4

## COMPARISON OF PROJECT SCHOOL A PRE, INTERIM AND POST-TEST RESULTS

## One Factor ANOVA - Repeated Measures for X1 - X3

| Source:          | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|------------------|-----|-----------------|--------------|---------|----------|
| Between subjects | 41  | 77.968          | 1.902        | 1.169   | .2701    |
| Within subjects  | 84  | 136.667         | 1.627        |         |          |
| treatments       | 2   | 9.063           | 4.532        | 2.912   | .06      |
| residual         | 82  | 127.603         | 1.556        |         |          |
| Total            | 125 | 214.635         |              |         |          |

Reliability Estimates for- All treatments: .144 Single Treatment: .053  
 Note: 48 cases deleted with missing values.

## One Factor ANOVA - Repeated Measures for X1 - X3

| Group:       | Count: | Mean: | Std. Dev.: | Std. Error: |
|--------------|--------|-------|------------|-------------|
| PRETEST      | 42     | 4.667 | 1.588      | .245        |
| INTERIM TEST | 42     | 4.548 | 1.253      | .193        |
| POSTTEST     | 42     | 5.167 | .961       | .148        |

## One Factor ANOVA - Repeated Measures for X1 - X3

| Comparison:         | Mean Diff: | Fisher PLSD: | Scheffe F-T: | Dunnett t: |
|---------------------|------------|--------------|--------------|------------|
| PRETEST vs INTERIM  | .119       | .542         | .096         | .437       |
| PRETEST vs POSTTEST | -.50       | .542         | 1.687        | 1.837      |
| INTERIM vs POSTTEST | -.619      | .542*        | 2.586        | 2.274      |

\*Significant at 95%

TABLE 5

## COMPARISON OF PROJECT SCHOOL B PRE, INTERIM AND POST-TEST RESULTS

## One Factor ANOVA - Repeated Measures for X1 - X3

| Source:          | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|------------------|-----|-----------------|--------------|---------|----------|
| Between subjects | 47  | 70.222          | 1.494        | 1.288   | .1481    |
| Within subjects  | 96  | 111.333         | 1.16         |         |          |
| treatments       | 2   | 1.847           | .9242        | .793    | .4555    |
| residual         | 94  | 109.486         | 1.165        |         |          |
| Total            | 143 | 181.556         |              |         |          |

Reliability Estimates for- All treatments: .224 Single Treatment: .088  
 Note: 42 cases deleted with missing values.

## One Factor ANOVA - Repeated Measures for X1 - X3

| Group:       | Count: | Mean: | Std. Dev.: | Std. Error: |
|--------------|--------|-------|------------|-------------|
| PRETEST      | 48     | 4.875 | 1.315      | .19         |
| INTERIM TEST | 48     | 4.854 | .945       | .136        |
| POSTTEST     | 48     | 5.104 | 1.096      | .158        |

## One Factor ANOVA - Repeated Measures for X1 - X3

| Comparison:         | Mean Diff: | Fisher PLSD: | Scheffe F-T: | Dunnett t: |
|---------------------|------------|--------------|--------------|------------|
| PRETEST vs INTERIM  | .021       | .437         | .004         | .095       |
| PRETEST vs POSTTEST | -.229      | .437         | .541         | 1.04       |
| INTERIM vs POSTTEST | -.25       | .437         | .644         | 1.135      |

### C. Student Achievement Data

At the outset of this project, student achievement was determined to be the primary measure of the success of the Staff Development Program's efforts. Student achievement was looked at within each project school using a cohort group comparison, i.e., looking at growth between first and second grades as opposed to looking at first graders over two years. Student mobility was controlled for, reporting student achievement only for those students who attended a project school for the full academic year.

Changes in average NCE scores for total reading and total math, on the CAT-85, were used as the measure of achievement. Tables 6 and 7 reflect changes in students' average NCE scores for reading and math at Project Schools A and B respectively, for teachers whose ISOI scores and Taxonomy Level are reflected in the previous data.

TABLE 6

#### PROJECT SCHOOL A TOTAL READING AND MATH

| Subject | N   | 87-88 | Std Dev | N   | 88-89 | Std Dev |
|---------|-----|-------|---------|-----|-------|---------|
| Math    | 108 | 36.18 | 15.96   | 142 | 44.35 | 16.57   |
| Reading | 108 | 35.93 | 15.61   | 141 | 39.86 | 12.88   |

TABLE 7

#### PROJECT SCHOOL B TOTAL READING AND MATH

| Subject | N  | 87-88 | Std Dev | N   | 88-89 | Std Dev |
|---------|----|-------|---------|-----|-------|---------|
| Math    | 86 | 42.66 | 18.49   | 136 | 44.75 | 15.41   |
| Reading | 86 | 43.83 | 15.67   | 136 | 43.24 | 12.81   |

The students in School A classes outperformed their counterparts in School B. Although not considered statistically significant, School A's gains in math are particularly noteworthy.

## V. CONCLUSIONS

The core of Grand Rapids Staff Development Program, supported in part by the Steelcase Foundation, consisted of training and practice with coaching/feedback of the Elements of Effective Instruction, developed in large part by Dr. Madeline Hunter. This evaluation assessed the level of classroom implementation of program concepts and skills through observation of classroom performance and structured interviews with a sample of teachers at Schools A and B. In regard to student outcomes, standardized math and reading test scores of students in sample teachers' classes were compared using 1987-88 results as a baseline and 1988-89 results as a measure of program effects. A group of classrooms at matched control schools were used as an additional comparison.

In each assessment -- observation, interview and student outcomes -- educationally significant results were noted. In regard to the observations, teachers in Schools A and B demonstrated, on the average, a 10-15% increase in productive teacher behaviors during the program implementation period.

In regard to the structured interviews using the Taxonomy of Teacher Reflective Thought, statistically significant increases in the level of instructional thought were noted between the posttest and the pretest/interim test interview results. The fact that no changes were noted between the pretest and interim test results suggests that behavior modeling, practice and coaching are critical elements of an inservice program of this type. Classroom training without distributed practice with feedback may not produce desired changes in productive teaching. Finally, it was noted that School A, whose teachers scored lower than did the teachers at School B on the pretest, outperformed their counterparts on the posttest. Interestingly, the teachers at School A participated in coaching experiences more fully than did the teachers at School B.

In regard to student outcomes, gains were noted between the 1987-88 and 1988-89 student achievement scores in Schools A and B as compared to the students in the matched control schools. Teachers participating in structured interviews at School A experienced an average NCE gain of +3.9 in reading and +8.2 in math. The total population of teachers at School A experienced an average NCE gain of +5.4 in reading and +6.6 in math. Their control school experienced an average NCE change of -2.6 in reading and no change in math. Teachers participating in structured interviews at School B experienced an average NCE change of -.6 in reading and +2.1 in math. The total population of teachers at School B experienced an average NCE gain of +1.6 in reading and +1.8 in math. Their control school experienced an average NCE change of +3.8 in reading and -3.6 in math.

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